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Medicinal Plant Diversity of Dr. Somervell Memorial C.S.I. Medical College and Hospital Campus, Karakonam, Kerala, Western Ghats, India.

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Abstract

Scientific exploration of floristic multiplicity is a vital requirement for its conservation, management and sustainable consumption. In the Western Ghats of the Karakonam is mostly of tropical deciduous, monthly surveys of flowering occurrence of different taxa. The Medicinal plant diversity of Dr. Somervell Memorial C.S.I. Medical College Campus, Karakonam was conducted from June 2019 to December 2019. Study was performed in all parts of the study area and Medicinal plant samples were collected. After field survey, all plants were identified by botanical name and family with the help of available literature. The total Medicinal plant species recorded, indicated the heterogeneous floristic composition in the college campus. Maximum species diversity was recorded of angiosperms. Herbaceous genera were recorded more in number than the genera of shrubs, climbers, and trees. The researchers can explore this information in planning of sustainable utilization of these resources in and around Trivandrum District.

Keywords
Diversity, Medicinal Plants, Campus, Monthly, Western Ghats.

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INTRODUCTION

Human societies have been in close contact with their environments since the beginning of their formation and used the ingredients of the environment to obtain food and medicine (Sukumaran et.al. 2019). Natural products from plants, animals and minerals are the basis for treating human diseases (Firenzuoli and Gori, 2007). Since time immemorial, mankind has used plant extracts from different plants to cure many diseases and thus relieve him from physical agony (Ahmed et al., 2007) Plants are always considered as a primary source of drugs in traditional and alternative system of medicine in various forms such as crude form,

juice, decoction, and crude extracts (Poonam and Singh, 2009). Plant resources have remained an integral part of human society throughout history (WHO, 2002). These medicinal plants consider as rich resources of ingredients which can be used in drug development and synthesis (Uniyal, 2002). The value of medicinal plants to the mankind is very well proven. It is estimated that 70% to 80% of the people worldwide rely chiefly on traditional health care system and largely on herbal medicines (Shanley and Luz, 2003). India harbors about 15 percent (3000 - 3500) medicinal plants, out of 20000 medicinal plants of the world. About 90 percent of these are found growing wild in different climatic regions of the country (Farombi, 2003; Kumar and Katakam, 2002) Herbs are always considered as a very important source of medicine especially for the population of the rural areas and tribes because of the high cost and difficult accessibility to modern medicine (Kala et al, 2006). The term of medicinal plants includes a various types of plants used in herbalism and some of these plants have medicinal activities (Singh et al. 1997).

As medicinal plants receive increased scientific and commercial attention, there is increasing pressure on the wild plant populations from which most medicinal plants are harvested (Mohanan, 1981). The booming global market for herbal drugs pushed more than 100 medicinal plant species in Kerala to the verge of extinction. Unsustainable extractions from the wild and unscientific methods of cultivation are endangering more species (Adriano et al, 2016). Commercial exploitation has also sometimes led to traditional medicines becoming unavailable to the indigenous peoples that have relied on them for centuries or millennia (Rao and Rao, 2014). For all of these reasons, the study and conservation of medicinal plant (and animal) species has become increasingly urgent. The accelerating loss of species and habitat worldwide adds to this urgency. Already, about 15,000 medicinal plant species may be threatened with extinction worldwide. Experts estimate that the Earth is losing at least one potential major drug every two years (Steenhuysen, 2007). The distribution of medicinal plants species in a campus play an important role in elucidating the larger patterns of distribution. Documentation of the medicinal plant flora in Dr. Somervell Memorial C.S.I. Medical College is more helpful to the Pharmacological students and researchers. Objective of the present research is exploration of existed medicinal plant flora and assessment of their significance in the college Campus.

MATERIALS AND METHODS

Geography of the area

Thiruvananthapuram district is one of the smallest districts in Kerala, bounded on the east by Tirunelveli district, south by Kanyakumari district of Tamil Nadu, north by Kollam district and west by the Arabian Sea. The present study was conducted in Dr. Somervell Memorial C.S.I. Medical College, Karakonam campus of southern Western Ghats, which comes under Kunnathukal Panchayat of Neyyatinkara Taluk, Trivandrum district, Kerala state. Topographically, the Panchayat varies from mountain regions, low lying plains and rocky area. Karakonam is a small village located around 30 km from Thiruvananthapuram, the capital city of Kerala. The geographical location which the research conducted is lies between 8°23’11.46” N 77°10’10.25” E. In broad the flora of the campus is natural and semi-natural, represented by a variety of sequence.

The weather of this area is fairly humid and annual rainfall is 538.5 mm and varies from 70 mm (minimum during February) to 435 mm (maximum - June). However, there is no rainfall in the month of January and February. The mean monthly temperature varies from a maximum of 33.4°C in the month of May to a minimum of 22.9°C in December. The soil in the campus is the combination of sandy loam and black soil with laterite grave.

The story of the origin of the Dr. Somervell Memorial CSI Medical College and Hospital is more than a Century old, since 1892 to be exact. By that time, the London Missionary Society (LMS) Christian Protestant Missionaries that started its evangelical work in 1806 with its involvement in the socio-economic, spiritual and educational life of the marginalized, illiterate, neglected people of the erstwhile South Travancore, victims of superstition and epidemics like malaria and cholera. In later stages after the missionaries returned from India, Bishop Arnold Legg, Bishop William Paul Vachalan, Bishop Samuel Amirthm, Dr. I. Azariah, Bishop J.W. Gladstone, Dr. J. Bennet Abraham played a decisive role in developing this vast campus for health care extension for the society. In this campus, the health care service was started as a dispensary and now it reached up to a medical college with an Oncology unit namely Karakonam Cancer Centre (K.C.C.).

Plant collection and identification

This data is collected during the study period from July 2019 to December 2019. During this period, weekly collections were taken from plants during early morning. Every time, fresh collected materials were exhibited to the taxonomic expert to get the taxonomic information about the plants. The photographs of selected plants were also taken

during the field trips. The habitual data were recorded in the field note book. Polythene bags were used to keep the collected materials in fresh condition. Hand lens was used for recording the morphological characters. The collected plants were identified correctly and confirmed by referring various flora like The flora of Nilgiri and Pulney Hill top by Fyson (1921), The flora of presidency of madras by Gamble and Fischer (1957). In addition to the above flora Joseph (1981), Nair and Sasthri (1987) Sasidharan (2004) Prakash et al. (2006) Gamble and Fischer (1916-1936), Mohanan and Henry (1994) and Nayar et al. (2014). Identification was further confirmed after matching the specimens with authentic or type sheets available at Tropical Botanical Garden and Research Institute (TBGRI), Palode, Kerala. Citations and nomenclature of the taxa were obtained from the databases such as the International Plant Names Index (IPNI) (http:// www.ipni.org), 'Tropicos' (http://www.tropicos.org) and The Plant List (http://www.theplantlist.org) available online were referred. Identified plants were verified and by the herbarium of TBG&RI, Palode, Thiruvananthapuram. The plant specimens and their medicinal uses, Habit, useful part, for which the particular plant is thoroughly verified with Kirthikar and Basu (1980). The data gathered through interviews was verified with the available literature (Yoganarasimhan and Chelladurai, 2000; Parota, 2001. The relevant information about the local names and their morphological useful parts gathered from the Traditional Practitioners, in and around village of the study area.

RESULTS

Plants have been a major source of medicine for human kind. The demands for medicinal plants are increasing very rapidly, mainly because of the harmful effects of synthetic chemical drugs. The global clamor for more herbal ingredients creates possibilities for the local cultivation of medicinal crops as well as for the regulated and sustainable harvest of wild plants. Such endeavors could help to raise rural employment in the development countries, boost commerce around the world and perhaps contribute to the health of millions (Sukumaran et.al. 2019).

The firsthand information on the medicinal plant diversity present in the Dr. Somervell Memorial Medical College campus was arranged systematically. In the present study there are 125 medicinally important plant species belonging to 52 families were identified from the study area and their botanical name, family name, local name, parts used were studied and given in Table 1. The total number of genera represented in this study was 112. In this study reveals 51 family representations (Fig. 3.). Among the surveyed list Euphorbiaceae floral biodiversity was represented by the highest number of species (7 species). The other major representations are followed by Aamranthaceae, Apocynaceae, Cucurbitaceae, Fabaceae, Lamiaceae, Moraceae (5 species), Acanthaceae, Asteraceae, Malvaceae, Rutaceae, Solanaceae (4 species) (Fig. 3.). Analysis of life-form floristic diversity of the study area showed that herbaceous species exhibited maximum species constituting 50 taxa (40%) of the total flora, followed by trees 39 (31%), shrubs 20 taxa (16%) and climbers 17 taxa (13%) (Fig. 1 &2)

Table 1: List of medicinal plants in Dr. Somervell Memorial C.S.I. Medical College Campus

Sl.No	*Scientific name of the plant*	*Family*	*Local name (Malayalam)*	*Habit*	*Parts used*
1	*Abutilon indicum* G. Don.	Malvaceae	Vellooram	Shrub	Leaves, root, fruits, seeds and bark.
2	*Acalypha fruticosa* Forsk.	Euphorbiaceae	Athaa thazhai	Herb	Whole plant
3	*Adatoda vasica* Ness.	Acanthaceae	Adalodakam	Shrub	Whole plant
4	*Aerva lanata* Juss.	Amarantaceae	Cherula	Herb	Root
5	*Aerva tomentosa* Forsk.	Amarantaceae	Valiya Cherula	Herb	Whole plant
6	*Allamanda cathartica* L.	Apocynaceae	Kolabi poo	Shrub	Whole plant
7	*Alysicarpus rugosus* Dc.	Fabaceae	Vellulli	Herb	Whole plant
8	*Amarantus viridis* L.	Amarantaceae	Kuppakeera	Herb	Whole plant
9	*Andrographis echioides* Nees.	Acanthaceae	Gopuram thangi	Herb	Leaves and stems
10	*Andrographis paniculata* Nees.	Acanthaceae	Kiriyath	Herb	Whole plant
11	*Boerhaavia diffusa* L.	Nyctaginaceae	Mukkarattai	Herb	Whole plant

12	*Bougainvillaea spectabilis* Willd.	Nyctaginaceae	Kadalasu chedi	Climber	Leaves, stems and flowers
13	*Calotropis procera* R. Br.	Apocynaceae	Erukku	Shrub	Whole Plant
14	*Cassia occidentalis* L.	Fabaceae	Karinthakara	Shrub	Whole plant
15	*Cleome viscosa* L.	Capparidaceae	Kattu Kaduku	Herb	Leaves, seeds and roots R
16	*Datura metal* L.	Solanaceae	Ummam	Herb	Leaves and fruits
17	*Ficus religiosa* L.	Moraceae	Aal maram	Tree	Whole plant
18	*Ixora coccinea* L.	Rubiaceae	Idly poo	Shrub	Leaves, roots and flowers
19	*Mangifera indica* L.	Anacardiaceae	Maavu	Tree	Stem, bark and leaves
20	*Murraya koenigii* Spr.	Rutaceae	Kariveppu	Shrub	Leaves, bark and root
21	*Ocimum sanctum* L.	Lamiaceae	Tulasi	Herb	Leaves
22	*Phyllanthus niruri* L.	Euphorbiaceae	Keezhanelli	Herb	Whole plant
23	*Psidium guajava* L.	Myrtaceae	Pera	Tree	Leaves and Fruit
24	*Quisqualis indica* L.	Compretaceae	Kulamarinji	Shrub	Fruit, leaves and seeds
25	*Sida acuta* Burm. V.	Malvaceae	Aanakurunthotti	Shrub	Roots and leaves
26	*Sida cordifolia* L.	Malvaceae	Katturam	Herb	Whole plant
27	*Trichodesma indicum R. Br. K.*	Boraginaceae	Allutaitumpai	Herb	Leaves and roots
28	*Polyalthia longifolia* Sonn.	Annonaceae	Arana Maram	Tree	Leaves and Fruits
29	*Cassia fistula* Linn.	Fabaceae	Konna	Tree	Bark and Roots
30	*Emblica officinalis* Gaertn.	Euphorbiaceae	Nelli	Tree	Whole Plant
31	*Azadirachta indica* A. Juss.	Meliaceae	Veppu	Tree	Whole Plant
32	*Melia azedarach* Linn.	Meliaceae	Kattu Veppu	Tree	Whole Plant
33	*Asparagus racemosus.* Herb.	Liliaceae	Sathavari	Climber	Roots
34	*Hibiscus rosasinensis* Linn.	Malvaceae	Chemparathi	Shrub	Flower and Leaves
35	*Solanum nigrum* Linn.	Solanaceae	Chunda	Herb	Fruits
36	*Mimosa pudica* L.	Mimosaceae	Thottavadi	Herb	Whole Plant
37	*Syzygium samarangense* L.	Myrtaceae	Chamba	Tree	Fruit
38	*Santalum album* L.	Santalaceae	Chandanam	Tree	Stem
39	*Piper longum* L.	Piperaceae	Thippali	Climber	Fruit
40	*Aristolochia indica* L.	Aristalochiaceae	Garudakkodi	Climber	Whole Plant
41	*Acorus calamus* L.	Acoraceae	Vayambu	Herb	Rhizome
42	*Aegle marmelos* L.	Rutaceae	Koovalam	Tree	Fruit
43	*Alpinia galanga* L.	Zygebaraceae	Kolinji	Herb	Rhizome
44	*Biophytum sensitivum* (L.) DC.	Oxalidaceae	Mukkutti	Herb	Rhizome
45	*Cyperus rotundus* L.	Cyperaceae	Muthanga	Herb	Rhizome
46	*Daemia extensa* R.BR	Asclepiadaceae	Velipparuthi	Climber	Whole Plant
47	*Gloriosa superba* L.	Colchicaceae	Menthonni	Climber	Whole Plant
48	*Heracleum candolleanum* (Wight & Arn.)	Apiaceae	Chittelam	Herb	Rhizome

49	*Holostemma adakodien* Schult.	Asclepiadaceae	Adapathiyan	Climber	Rhizome
50	*Kaempferia galangal* L.	Zyngiberaceae	Kacholam	Herb	Rhizome
51	*Nilgirianthes ciliates* (Nees) Bremek.	Acanthaceae	Karim Kurinji	Herb	Root
52	*Saraca asoca (Roxb.) Willd.*	Fabaceae	Asokam	Tree	Flower
53	*Hemidesmus indicus* (L.) R. Br.	Apocynaceae	Nannari	Climber	Root
54	*Coccinia cordifolia* (L.) Cong.	Cucurbitaceae	Koval	Climber	Fruit
55	*Centella asiatica* Urb.	Apiaceae	Kudangal	Creeper	Leaves
56	*Cardiospermum halicacabum* L.	Sapindaceae	Uzhinja	Climber	Whole Plant
57	*Artocarpus integrifolia* L.	Moraceae	Anjil	Tree	Fruit
58	*Lantana camara* L.	Verbenaceae	Poochedi	Shrub	Leaves and Flowers
59	*Murraya paniculata* (L) Jacq.	Rutaceae	Kattu Kariveppu	Tree	Leaves
60	*Annona squamosa* L.	Anonaceae	Seethapazham	Tree	Fruit
61	*Garcinia gummi-gutta (*L.*) Robs.*	Guttiferae	Kodampuli	Tree	Fruit
62	*Swietinia macrophylla* King.	Meliaceae	Mahagani	Tree	Bark
63	*Moringa oleifera* Lam.	Moringaceae	Moringa	Tree	Whole Plant
64	*Tamarindus indica* L.	Ceasalpinaeae	Tamarind tree	Tree	Leaves and Fruit
65	*Albizia saman* (Jacq.) F. Muell.	Mimosaceae	Rain tree	Tree	Fruit
66	*Terminalia cattapa* L.	Combretaceae	Badam	Tree	Fruit
67	*Carica papaya* L.	Caricaceae	Papaya tree	Tree	Leaves and Fruit
68	*Cocos nucifera* L.	Arecaceae	Coconut tree	Tree	Flower, Root and Fruit
69	*Artocarpus heterophyllus* Lam.	Moraceae	Jack fruit tree	Tree	Fruit
70	*Ficus racemosa* L.	Moraceae	Athi	Tree	Fruit
71	*Cinnamomum zeylanicum* Blume.	Lauraceae	Karuva	Tree	Leaves and Bark
72	*Tectona grandis* L.f.	Verbanaceae	Thekku	Tree	Leaves
73	*Delonix regia* (Bojer ex Hook.) Raf.	Ceasalpinaeae	Gulmohar	Tree	Flower
74	*Abrus precatorius* L.	Fabaceae	Kunni	Climber	Leaves, Root
75	*Ricinus communis* L.	Euphorbiaceae	Avanakku	Shrub	Whole Plant
76	*Punica granatum.* L.	Lythraceae	Mathalam	Shrub	Fruit
77	*Aloe barbadensis* Miller.	Asphodelaceae	Kattar Vazha	Herb	Leaves
78	*Citrus lemon* L.	Rutaeceae	Narakam	Shrub	Fruit
79	*Vitex negundo* L.	Verbenaceae	Kaatu nochchi	Tree	Leaves
80	*Solanum surattense* (Burm.f.)	Solanaceae	Mullan kaththiri	Herb	Fruit
81	*Coccinia grandis* (L.) Voigt	Cucurbitaceae	Koval	Climber	Fruit
82	*Acalypha indica* L.	Euphorbiaceae	Kuppameni	Herb	Leaves
83	*Morinda pubescens* J.E. Smith	Rubiaceae	Manjanathi	Tree	Leaves
84	*Lawsonia inermis* L.	Lythraceae	Mylanchi	Tree	Leaves
85	*Ervatamia divaricata* (L.) Burkill.	Aboceae	Nanthyarvattam	Shrub	Flowers

86	*Achyranthes aspera* L.	Amaranthaceae	Kadaladi	Herb	Leaves
87	*Euphorbia hirta* L.	Euphorbiaceae	Paal chedi	Herb	Leaves
88	*Rosa indica* L.	Rosaceae	Rosa	Herb	Flowers
89	*Leucus aspera* (Willd.) Link	Lamiaceae	Thumba	Herb	Flowers and leaves
90	*Amaranthus spinosus* L.	Amaranthaceae	Pachakkeera	Herb	Leaves
91	*Tridax procumbens* L.	Trapaceae	Cheviyan Pullu	Herb	Leaves
92	*Gynandropsis pentaphylla* DC.	Capparidaceae	Kattukaduku	Herb	Leaves
93	*Chrysanthemum indicum* L.	Asteraceae	Sevanti	Herb	Flowers
94	*Clitoria ternatea* L.	Fabaceae	Sanghu Pushpam	Climber	Roots, leaves, seeds
95	*Coriandrum sativum* L.	Apiaceae	Malli	Herb	Leaves,
96	*Cynodon dactylon* (Linn) Pers.	Poaceae	Arukampul	Herb	Whole plant
97	*Eclipta prostrata* L.	Asteraceae	Kaikesi	Herb	Whole plant
98	*Nerium oleander* L.	Apocynaceae	Arali	Shrub	Leaves, roots
99	*Oryza sativa* L.	Poaceae	Nellu	Herb	Roots, grains
100	*Zingiber officinalis* Rose.	Zingiberaceae	Inchi	Herb	Leaves, Rhizome
101	*Borassus flabellifer* L.	Aracaceae	Pana	Tree	Fruit
102	*Cyanthillium cinereum* L.	Asteraceae	Poovankurunnu	Herb	Leaves
103	*Ensete superba* (Roxb.)	Musaceae	Kallu Vazha	Shrub	Rhizome and Fruit
104	*Mirabilis jalapa*. L.	Nyctaginaceae	Nalumani Chedi	Herb	Whole plant
105	*Curculigo orchioides* Gaertn.	Hypoxidaceae	Nilappana	Herb	Whole plant
106	*Capsicum frutescence* L.	Solanaceae	Kanthari Mulaku	Herb	Fruit
107	*Elaeocarpus serratus* L.	Elaeocarpaceae	Kara	Tree	Fruit
108	*Manihot esculenta* L.	Euphorbiaceae	Marachini	Shrub	Rhizome
109	*Chromolaena odorata*		Communist Pacha	Herb	Leaves
110	*Hyptis suaveolens* L.	Lamiaceae	Naatta Poochedi	Herb	Leaves
111	*Ananas comosus* (L.) Merrill.	Bromeliaceae	Puruthi	Herb	Fruit
112	*Annona reticulate* L.	Annonaceae	Aana Mundiri	Tree	Fruit
113	*Colocasia affinis* Schott.	Araceae	Chembu	Herb	Rhizome
114	*Areca catechu* L.	Aracaceae	Kamuku	Tree	Leaf and Fruit
115	*Clerodendrum infortunatum* L.	Lamiaceae	Peruvalam	Herb	Leaves
116	*Curcuma angustifolia* Roxb.	Zigiberaceae	Koova	Herb	Rhizome
117	*Anacardium occidentale* (R.Br.) Lindl.	Anacardiaceae	Paranki Maavu	Tree	Bark, Fruit
118	*Artocarpus altilis (Parkinson) Fosberg.*	Moraceae	Seema Plavu	Tree	Fruit
119	*Alstonia scholaris (L.) R.Br.*	Apocynaceae	Ezhilam Pala	Tree	Flower
120	*Epipremnum aureum (Linden and André) G.S.Bunt.*	Araceae	Money Chedi	Climber	Leaves
121	*Annona muricata* L.	Annonaceae	Aathi	Tree	Fruit
122	*Plectranthus amboinicus (Lour.) Spreng.*	Lamiaceae	Navara	Herb	Whole Plant
123	*Cucurbita pepo* L.	Cucurbitaceae	Vellari	Climber	Fruit
124	*Benincasa hispida (Thunb.) Cogn.*	Cucurbitaceae	Kumbalam	Climber	Fruit

125	*Cucurbita pepo* L.	Cucurbitaceae	Mathan	Climber	Fruit
126	*Sauropus androgynus* (L.) *Merr.*	Phyllanthaceae	Madhura Cheera	Shrub	Leaves

Fig. 3. The Medicinal Plant Family Distribution in Dr. Somervell Memorial C.S.I. Medical College Campus

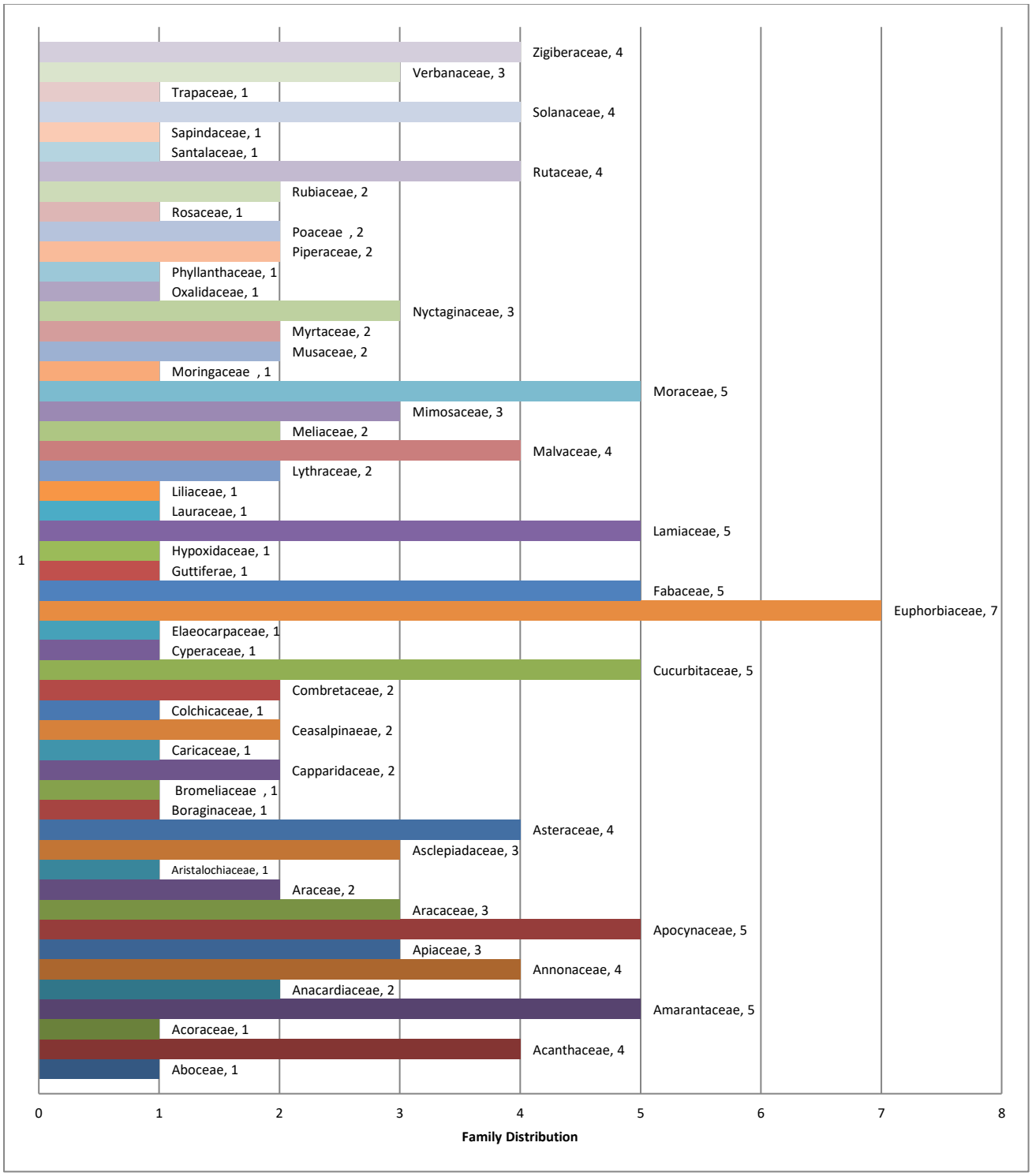


Fig. 1. The Medicinal Plant Species Distribution of Dr. Somervell Memorial C.S.I. Medical College Campus (%)

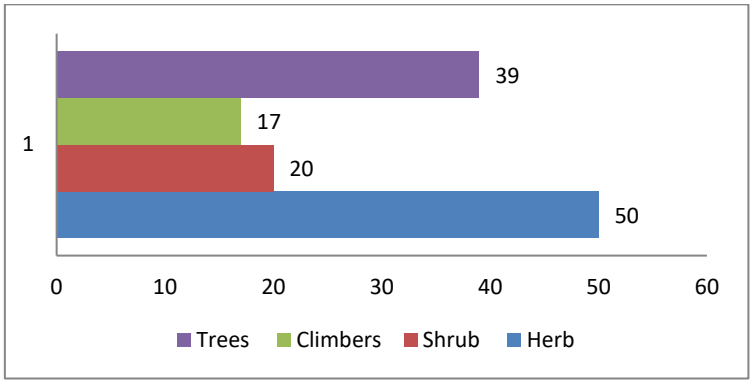
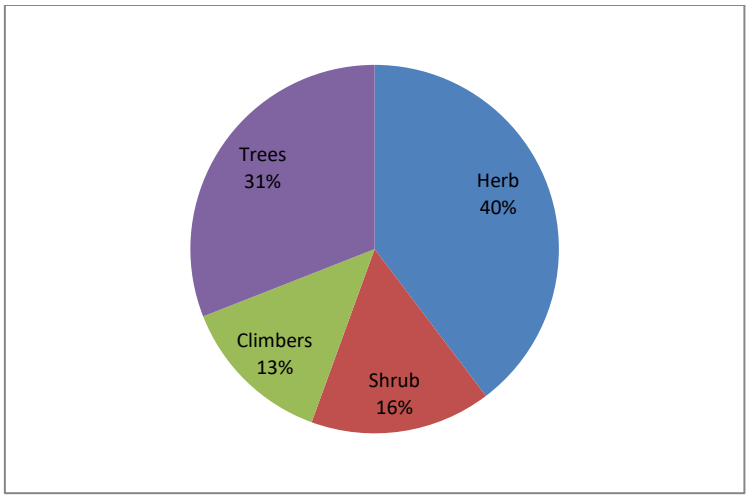
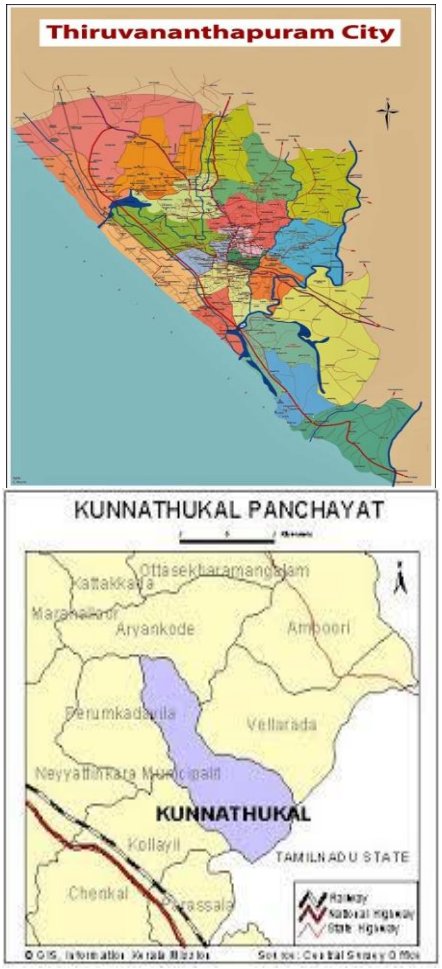


Fig. 2. The Medicinal Plant Habitat Distribution of Dr.Somervell Memorial C.S.I. Medical College Campus (%)



Map.1. Maps Showing the Geographical Area



DISCUSSION

India is extremely affluent in floristic diversity this accounts for 8% of the worldwide biodiversity (Ahmedullah & Nayar, 1986). Among the 17,672 angiosperms recorded in India, 4000 species reported from the state of Kerala. The environmental conditions are probably responsible for the high proportion of genera to species in Dr. Somervell Memorial C.S.I. Medical College and Hospital campus.

The Flora of Western Ghats (Subramanyam & Nayar, 1974), Flora of Thiruvananthapuram District shows that many of the families are well represented in the Dr. Somervell Memorial C.S.I. Medical College campus. The Flora of Thiruvananthapuram district as well as in the study area; it was in the second position in the Western Ghats (Subramanyam & Nayar, 1974). Angiosperm in India is usually dominated by herbaceous families about 71% of the genera are herbaceous. The present observation in the study area corroborates the same, herbaceous species accounts for 40% of the total species. Herbaceous vegetation plays an important role in nutrient conservation (Subitha et al., 2016; Felix et al., 2017). This information is beneficial for upcoming researches to assess ecological and biological processes. The diversity of biological spectrum types is represented by trees, shrubs, climbers and herbs. In this study is directly correlated by the previous studies (Adriano et al., 2016).

This research is conducted in the 50 acres of land of Dr. Somervell Memorial C.S.I. Medical College and indicate that act as a treasure of medicinal taxa. As of now, the Medicinal plant species in this campus is well protected and not affected by mass harvest of plants for pharmaceutical purposes. Exclusivity and richness of ecosystem and floristic variety of Dr. Somervell Memorial C.S.I. Medical College have the capacity in building and awareness that the campus is professionally managed and sustainably preserved for upcoming generation.

CONCLUSION

This study shows that even though the processing and consuming medicinal plants are still practiced in Western Ghats and this Medical College Campus is a place of Medicinal Plant Germplasm preservation. From this survey, it is concluded that, Dr. Somervell Memorial Medical College campus is enriched with very precious and medicinally useful herbals. An

additional research analysis and maintenance of the taxa in the precious campus is required to preserve the bio resources. Herbal medicines are mostly used to prevent diseases than cure. This study will promote a practical use of botanicals and must be continued focusing on its pharmacological validation. Further healthy detailed exploration and collection of ethno botanical information, chemical studies and screening for medicinal properties will provide cost effective and reliable source of medicine for the welfare of humanity.

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